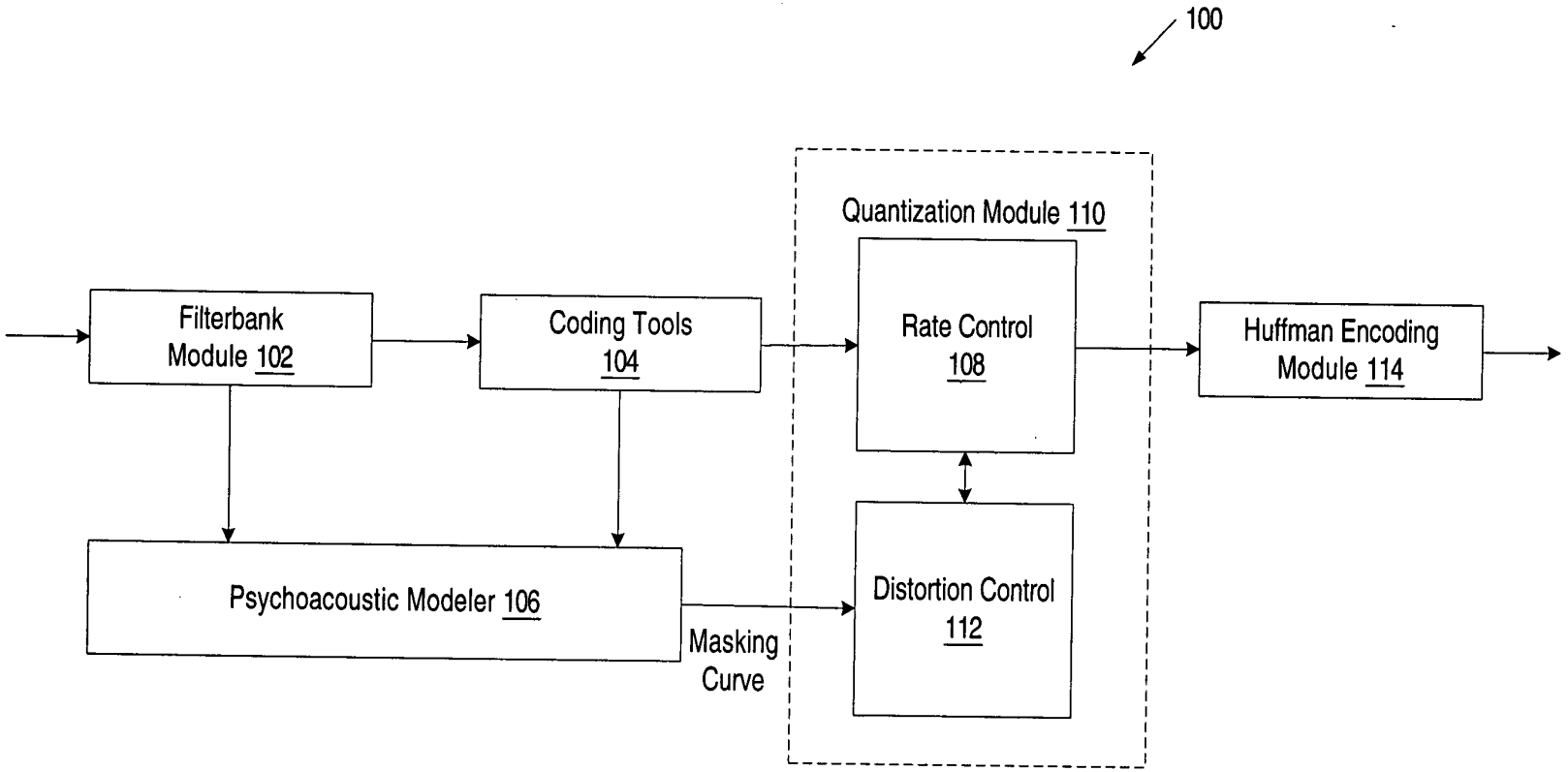
100
Quantization Module 110
Filterbank Module 102
Coding Tools 104
Rate Control 108
Huffman Encoding Module 114
Psychoacoustic Modeler 106
Masking Curve
Distortion Control 112

FIG. 1

200

202 Codebook Number, i	204 Unsigned_cb[i]	206 Dimension of Codebook	208 Largest Absolute Value for Codebook	210 Codebook listed in Table
0	-	-	0	-
1	0	4	1	A.2
2	0	4	1	A.3
3	1	4	2	A.4
4	1	4	2	A.5
5	0	2	4	A.6
6	0	2	4	A.7
7	1	2	7	A.8
8	1	2	7	A.9
9	1	2	12	A.10
10	1	2	12	A.11
11	1	2	(16) ESC	A.12
12	-	-	(reserved)	
13	-	-	percept. noise subst.	
14	-	-	intensity out-of-phase	
15	-	-	intensity in-phase	

Spectrum Huffman codebooks parameters

FIG. 2

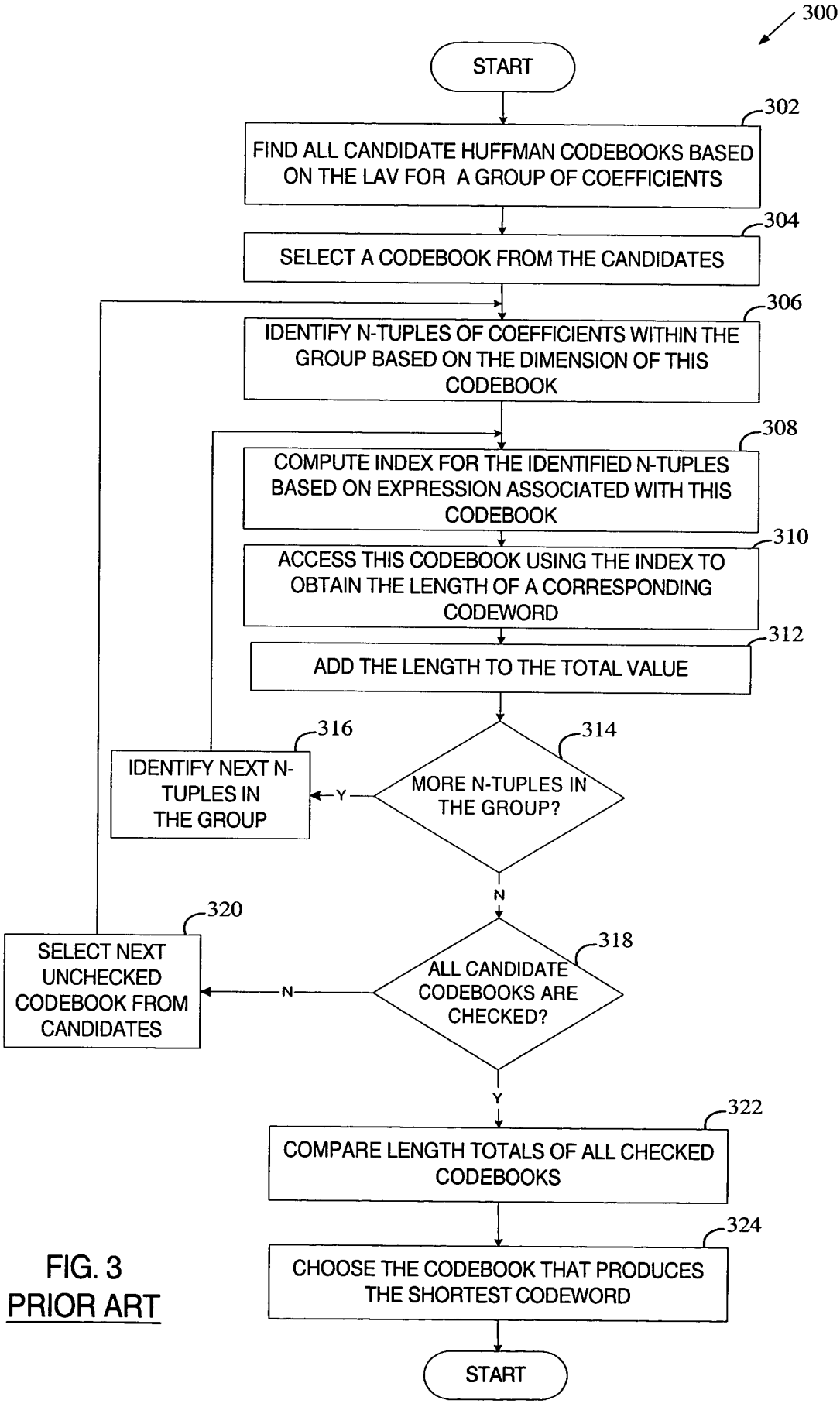

FIG. 3
PRIOR ART

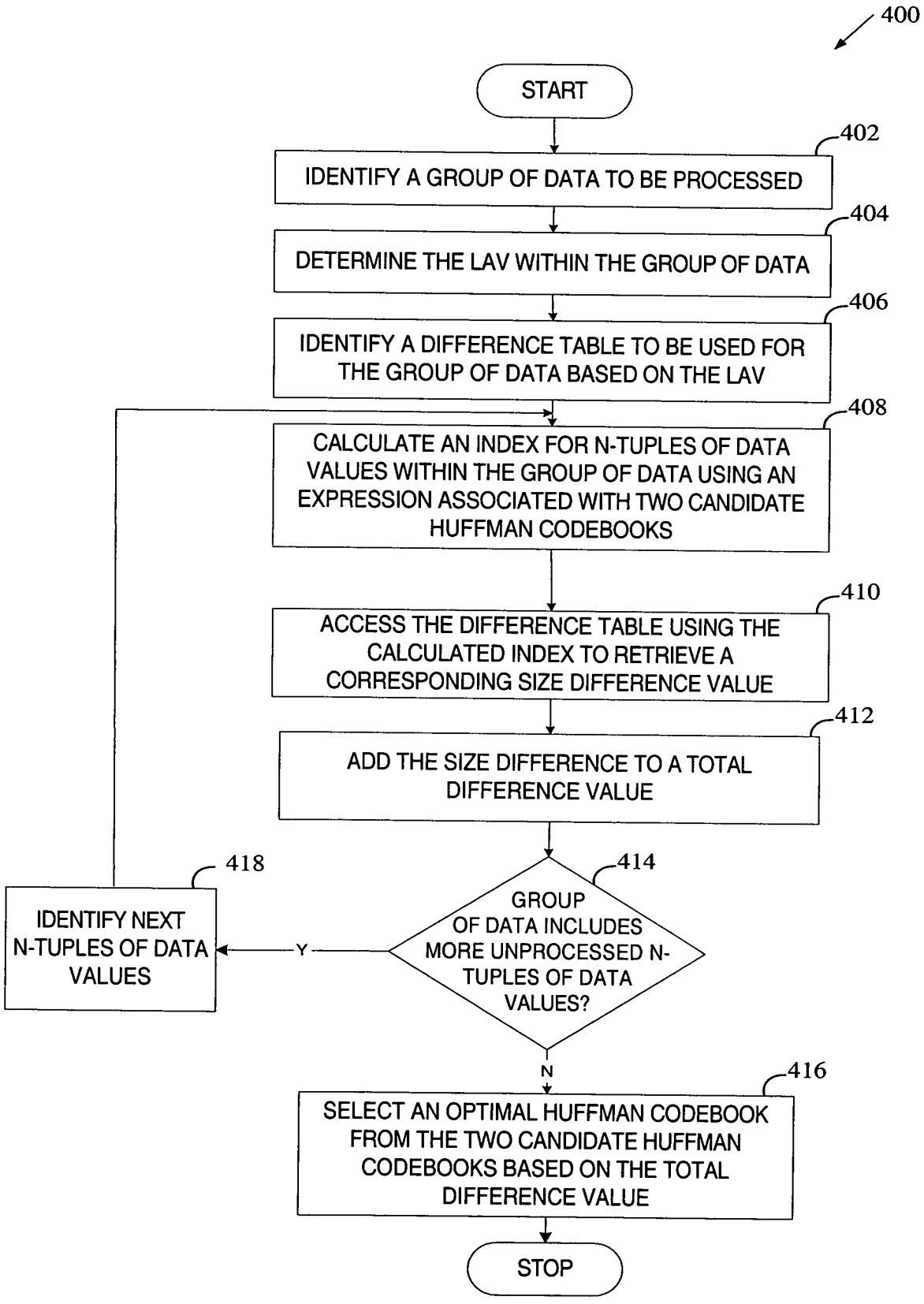
400
START
402
IDENTIFY A GROUP OF DATA TO BE PROCESSED
404
DETERMINE THE LAV WITHIN THE GROUP OF DATA
406
IDENTIFY A DIFFERENCE TABLE TO BE USED FOR THE GROUP OF DATA BASED ON THE LAV
408
CALCULATE AN INDEX FOR N-TUPLES OF DATA VALUES WITHIN THE GROUP OF DATA USING AN EXPRESSION ASSOCIATED WITH TWO CANDIDATE HUFFMAN CODEBOOKS
410
ACCESS THE DIFFERENCE TABLE USING THE CALCULATED INDEX TO RETRIEVE A CORRESPONDING SIZE DIFFERENCE VALUE
412
ADD THE SIZE DIFFERENCE TO A TOTAL DIFFERENCE VALUE
414
GROUP OF DATA INCLUDES MORE UNPROCESSED N-TUPLES OF DATA VALUES?
Y
418
IDENTIFY NEXT N-TUPLES OF DATA VALUES
N
416
SELECT AN OPTIMAL HUFFMAN CODEBOOK FROM THE TWO CANDIDATE HUFFMAN CODEBOOKS BASED ON THE TOTAL DIFFERENCE VALUE
STOP

FIG. 4

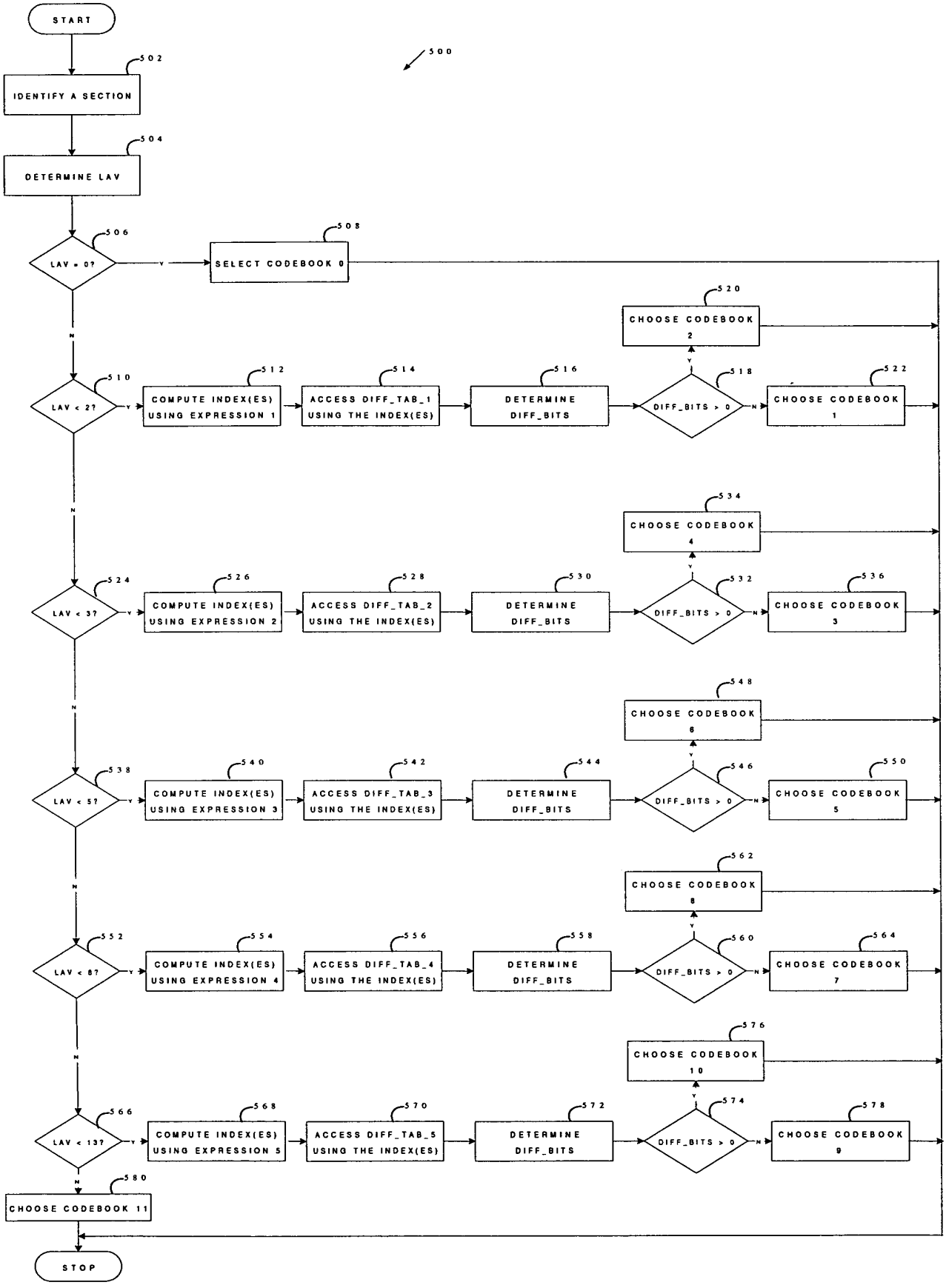
START
500
502
IDENTIFY A SECTION
504
DETERMINE LAV
506
LAV = 0?
Y
508
SELECT CODEBOOK 0
N
510
LAV < 2?
Y
512
COMPUTE INDEX(ES) USING EXPRESSION 1
514
ACCESS DIFF_TAB_1 USING THE INDEX(ES)
516
DETERMINE DIFF_BITS
518
DIFF_BITS > 0
Y
520
CHOOSE CODEBOOK 2
N
522
CHOOSE CODEBOOK 1
N
524
LAV < 3?
Y
526
COMPUTE INDEX(ES) USING EXPRESSION 2
528
ACCESS DIFF_TAB_2 USING THE INDEX(ES)
530
DETERMINE DIFF_BITS
532
DIFF_BITS > 0
Y
534
CHOOSE CODEBOOK 4
N
536
CHOOSE CODEBOOK 3
N
538
LAV < 5?
Y
540
COMPUTE INDEX(ES) USING EXPRESSION 3
542
ACCESS DIFF_TAB_3 USING THE INDEX(ES)
544
DETERMINE DIFF_BITS
546
DIFF_BITS > 0
Y
548
CHOOSE CODEBOOK 6
N
550
CHOOSE CODEBOOK 5
N
552
LAV < 8?
Y
554
COMPUTE INDEX(ES) USING EXPRESSION 4
556
ACCESS DIFF_TAB_4 USING THE INDEX(ES)
558
DETERMINE DIFF_BITS
560
DIFF_BITS > 0
Y
562
CHOOSE CODEBOOK 8
N
564
CHOOSE CODEBOOK 7
N
566
LAV < 13?
Y
568
COMPUTE INDEX(ES) USING EXPRESSION 5
570
ACCESS DIFF_TAB_5 USING THE INDEX(ES)
572
DETERMINE DIFF_BITS
574
DIFF_BITS > 0
Y
576
CHOOSE CODEBOOK 10
N
578
CHOOSE CODEBOOK 9
N
580
CHOOSE CODEBOOK 11
STOP

FIG. 5

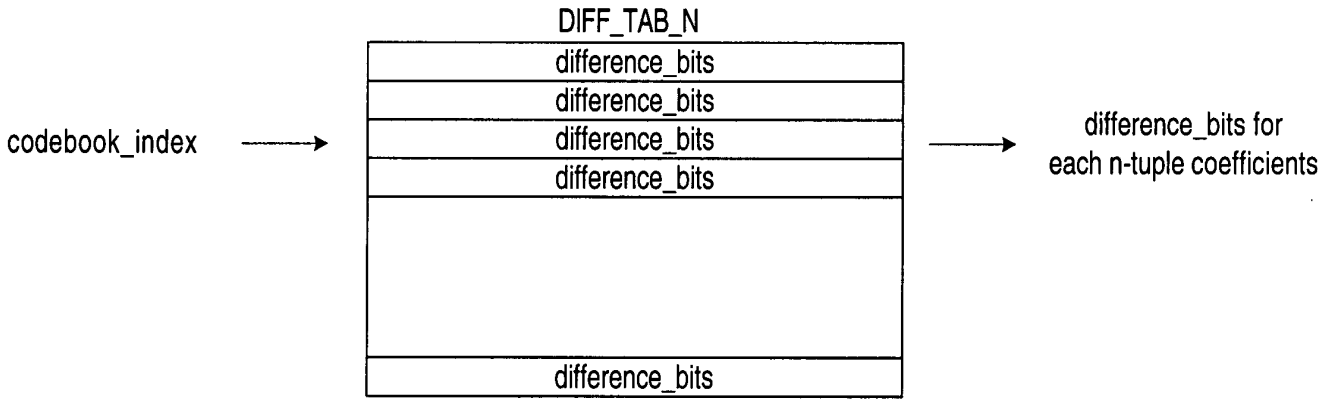
DIFF_TAB_N
codebook_index
difference_bits
difference_bits
difference_bits
difference_bits
difference_bits
difference_bits for
each n-tuple coefficients

FIG. 6

```
DIFF_TAB_1[] ~ {

2, 2, 2, 0, 2, 1, 2, 0, 2, 1, 2, 0, 0, 0, 0, 0, 2, 1, 3, 0, 1, 0,1, 0, 2, 1, 2, 0, 0,
0, 0, 0, 2, 2, 3, 0, 1, 1, 1, 0, 2, 2, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 1, 1, 2, 0, 1, 0, 1, 0, 2, 1, 1, 0, 0, 0, 0, 0, 1, 0, 1, 0, 0, -2, 0,
0, 1, 0, 1, 0, 0,0, 0, 0, 1, 1, 2, 0, 1, 0, 1, 0, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 2, 2, 2, 0, 1, 1, 1, 0, 3, 2, 2, 0, 0, 0, 0, 0, 2,
1, 2, 0, 1, 1, 1, 0, 1, 1, 3, 0, 0, 0, 0, 0, 2, 2, 2, 0, 3, 1, 1, 0, 2, 2, 2 };


DIFF_TAB_2[] = {

-3, -1, 0, 0, -1, 1, 0, 0, 0, 1, -1, 0, 0, 0, 0, 0, -1, 1, 1, 0, 1, 2, 1, 0,
1, 2, 0, 0, 0, 0, 0, 0, 0, 2, 2, 0, 1, 1, 1, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 2, 0, 2, 3, 2, 0, 2, 2, 2, 0, 0, 0, 0, 0, 1, 3,
3, 0, 2, 3, 3, 0, 1, 2, 2, 0, 0, 0, 0, 0, 1, 2, 3, 0, 1, 2, 3, 0, 0, 2, 2, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 2, 4, 0, 1, 4, 5, 0, 2, 4, 4, 0,
0, 0, 0, 0, 0, 3, 4, 0, 2, 3, 5, 0, 2, 3, 4, 0, 0, 0, 0, 0, 0, 2, 4, 0, 0, 2, 4, 0, 1,
2, 4 };


DIFF_TAB_3 [] = {

2, 2, 2, 2, 1, 2, 2, 2, 2, 0, 0, 0, 0, 0, 0, 0, 2, 2, 2, 2, 1, 2, 2, 2, 2, 0, 0, 0, 0,
0, 0, 0, 3, 2, 3, 2, 1, 2, 3, 2, 2, 0, 0, 0, 0, 0, 0, 0, 2, 2, 2, 1, 0, 1, 2, 2, 2, 0,
0, 0, 0, 0, 0, 0, 1, 1, 1, 0, -3, 0, 1, 1, 2, 0, 0, 0, 0, 0, 0, 0, 2, 2, 2, 1, 0, 1, 2,
2, 2, 0, 0, 0, 0, 0, 0, 0, 2, 2, 3, 2, 1, 2, 3, 2, 2, 0, 0, 0, 0, 0, 0, 0, 2, 2, 2, 2,
1, 2, 3, 3, 2, 0, 0, 0, 0, 0, 0, 0, 2, 2, 3, 2, 1, 1, 2, 2, 2 };


DIFF_TAB_4 [] = {

-4, -1, 1, 1, 1, 1, 1, 1, -1, 1, 2, 2, 2, 1, 2, 1, 1, 2, 3, 3, 2, 2, 2, 2, 1, 2, 3, 2,
3, 2, 2, 2, 1, 2, 3, 3, 3, 3, 2, 2, 1, 1, 3, 2, 3, 2, 3, 1, 1, 2, 2, 2, 2, 3, 3, 3, 1,
2, 2, 2, 2, 2, 3, 2 };


DIFF_TAB_5 [] = {

-5, -2, 0, 2, 2, 2, 1, 1, 1, 2, 1, 2, 1, 0, 0, 0, -2, 0, 2, 2, 2, 1, 2, 2, 2, 1, 1, 2,
1, 0, 0, 0, 0, 2, 2, 3, 2, 3, 3, 2, 2, 2, 3, 2, 2, 0, 0, 0, 2, 2, 3, 4, 3, 3, 3, 3, 3,
2, 3, 2, 3, 0, 0, 0, 2, 2, 3, 3, 4, 3, 4, 3, 3, 3, 3, 2, 3, 0, 0, 0, 2, 2, 3, 3, 4, 4,
3, 4, 3, 3, 2, 3, 2, 0, 0, 0, 2, 2, 3, 4, 4, 3, 4, 3, 3, 3, 3, 3, 2, 0, 0, 0, 2, 2, 2,
3, 3, 4, 3, 4, 4, 3, 3, 2, 2, 0, 0, 0, 2, 2, 2, 3, 3, 3, 3, 3, 3, 3, 4, 2, 3, 0, 0, 0,
1, 1, 2, 2, 3, 3, 3, 2, 3, 3, 3, 3, 2, 0, 0, 0, 2, 2, 2, 3, 3, 2, 3, 3, 3, 3, 3, 3, 3,
0, 0, 0, 1, 1, 3, 2, 2, 3, 3, 3, 2, 3, 3, 4, 3, 0, 0, 0, 2, 2, 2, 2, 3, 3, 3, 2, 3, 2,
2, 2, 3 };
```

FIG. 7

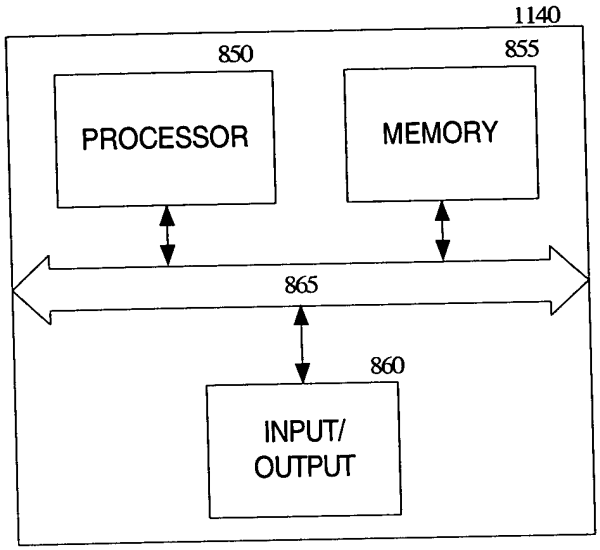

FIG. 8